SMTF Collaboration Meeting

October 5th – 7th, 2005

Working Group 1; Topic 2

"Updates on High Pressure Rinsing, Ultra Pure Water, and Cleanroom Handling"

Speakers: John Mammosser (JLab)

Saeki (KEK)

Detlef Reschke (DESY) - by video?

Discussion leaders: John Mammosser (JLab)
Allan Rowe (FNAL)

HPR/UPW/Cleanroom Conclusions

- Active particle counting during assembly is important. Instant feedback may be an important procedural change to the current processing schemes employed at the various Labs not currently doing so.
  - KEK and DESY have established that monitoring particle counts during component assembly is critical to their high gradient successes.
- A strong correlation has not been made between the specifics of Ultra Pure Water (UPW) quality, High Pressure Rinse (HPR) parameters and Cleanroom handling procedures and successful cavity tests.
  - SCRF programs that achieve high gradients have quite different processing procedures.
  - Performance consistency at the successful Labs is still a problem even when procedures are carefully followed.

HPR/UPW/Cleanroom Conclusions

- Process equipment failures are common to all SCRF programs.
  - HPR pumps, UPW quality degradation, Compressed air systems, etc.
- Few, if any predictive indicators or diagnostics are used in the UPW and HPR processing regime to anticipate systematic failures.
  - Current real-time monitoring includes UPW resistivity monitoring, TOC, etc.
- Data on HPR, UPW, and Cleanroom handling is starting to be collected. (JLab/DESY)
  - Data currently being collected includes: pre-rinse water particle count, resitivity, and TOC.

HPR/UPW/Cleanroom Conclusions

- HPR effectiveness studies are underway at CARE and JLab to study HPR nozzle spray patterns and particle removal rates.
  - An optimized HPR time and flow rate may be discovered along with nozzle geometry and material improvements.
- Post HPR water particle counts are not being performed.
  - A strong correlation in the particles counted from beginning to end of the rinse cycle may determine the HPR time length.

HPR/UPW/Cleanroom Conclusions

- This 3-day SMTF collaboration meeting was provided a good start on the discussion of these topics. Many more detailed discussions are required to truly get the detailed views from each Lab.

Recommendations

- Labs currently processing and testing SCRF cavities should carefully monitor particles during component assembly. Movement should stop when particle counts get elevated.

- Failure avoidance plans should be considered at existing and future facilities. (parallel HPR systems, etc.)

Recommendations cont…

- Careful failure analysis of each processing element needs to be performed. (Knowing the MTBF of critical components will prevent significant losses in processing time.)

- Develop methods to predict when systems may fail. E.g. DI bottle changes in UPW systems often leads to bacteria and TOC contamination.

Recommendations cont…

- UPW/HPR data should be carefully analyzed to determine process characteristics can be related to resultant cavity performance

- Systematic data (UPW quality, rinse parameters, etc.) taken at the various Labs during processing sequences should be compared to other Labs' data to identify targets for processing improvement.

Recommendations cont…

- An accurate particle count in the drained HPR water needs to be performed as a test of the quality of the HPR cycle.

- A task force should be formed that analyzes and coalesces the state-of-the-art HPR, UPW, and cleanroom handling procedures at all of the leading SCRF Labs. This task force would distill the information into a report to help guide the SCRF community toward repeatable 35-40MV/m cavities.